UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/004,980	12/07/2001	James H. Lee	H-204145	1793

7590 03/04/2004

CARY W. BROOKS
General Motors Corporation
Mail Code 482-C23-B21
P.O. Box 300
Detroit, MI 48265-3000

EXAMINER	
ALEJANDRO, RAYMOND	
ART UNIT	**PAPER NUMBER**
1745	

DATE MAILED: 03/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/004,980	LEE ET AL.	
	Examiner	Art Unit	
	Raymond Alejandro	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 November 2003 and 16 December 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *16-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *16-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

This communication is responsive to the amendments filed on 11/20/03 and 12/16/03. The applicants have overcome the art rejection. Refer to the foregoing amendment for further details on applicant's rebuttal arguments. Nevertheless, the claims are newly rejected over art as seen below. Thus, the claims are finally rejected for the reasons of record.

Election/Restrictions

1. Applicant's cancellation of claim 15 in Paper No. 11/20/03 is acknowledged.

Claim Objections

2. Claim 19 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. It is noted that claim 19 recites subject matter (i.e. the organic fluid) already incorporated into independent claim 16.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 16-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Bloomfield 3982962.

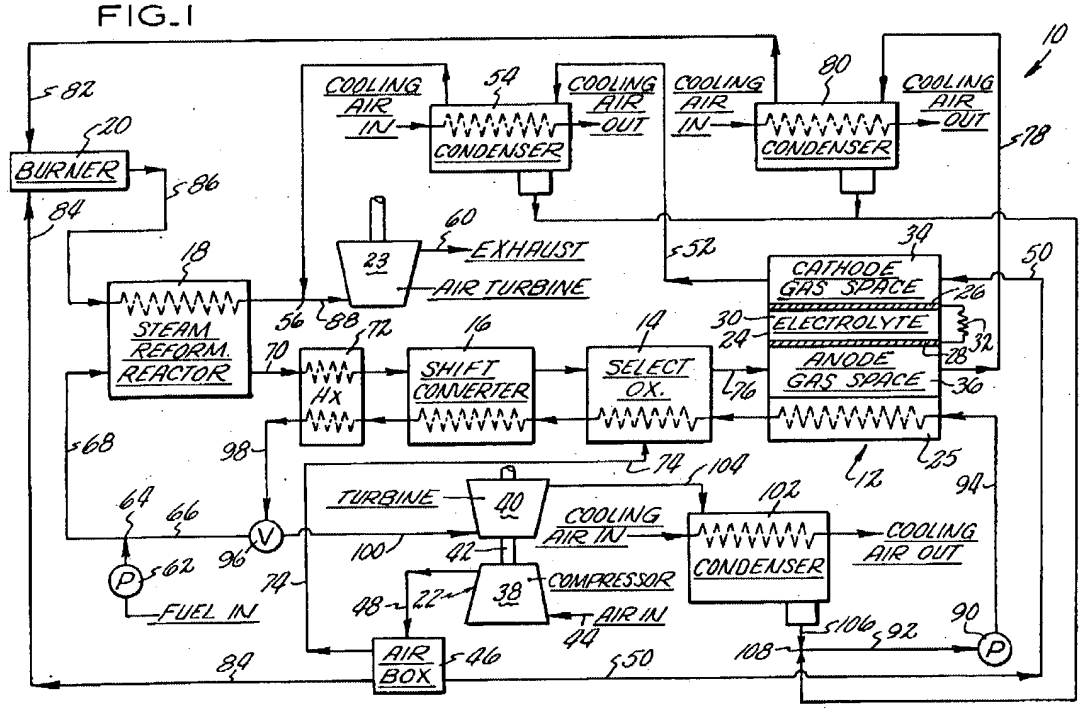
This application is drawn to a fuel cell system wherein the inventive concept comprises the specific components. Other limitations include the catalytic combustor and the organic fluid. As for claims 16 and 20:

Bloomfield discloses a fuel cell power plant (TITLE) comprising as shown in **Figure 1** below a pump 90 delivering water via a conduit 92 into thermal exchange relationship with stack 12 via a conduit 94 by passing the water through the thermal exchange portion 25 of the stack (COL 5, lines 28-32). It is disclosed the fuel cells comprises a single cell 24 and a thermal management portion 25 (COL 3, lines 23-27). Bloomfield discloses that the liquid is increased in pressure by pumps (COL 4, lines 1-5). Bloomfield further discloses that part of the water is changed to steam as it passes through the stack 12. The water and steam is superheated by passing it into heat exchange relationship with the fuel conditioning apparatus. It is further heated in the selective oxidizer 14 and the shift converter 16 and in the heat exchanger 72 (COL 5, lines 32-40). The steam then leaves the heat exchanger 72 and is delivered to a valve 96. Then, the remainder of the superheated stream is delivered into turbine 40 (*the expander*) via a conduit 100. The turbine drives the compressor 38 for compressing the air for the stack. The turbine is a steam driven turbine, however, any steam driven engine operably connected to run a compressor may be used (COL 5, lines 40-50).

Bloomfield further teaches that the exhaust from the turbine 40 is delivered into a condenser 102 via a conduit 104. Heat is removed from the steam by passing air through the condenser as shown. Liquid water, or possibly a mixture of liquid water and steams, leaves the

condenser 102 via a conduit 106 and is combined at 108 with water recovered from the anode and cathode effluent gas streams in the condensers 54, 80. The water is then delivered to the pump 90 via the conduit 92 and the process starts again (COL 5, lines 50-62). It is disclosed that the amount of water lost in the Rankine cycle loop is recovered in the condensers 54, 80 and which is combined at 108 with the water which recirculates through the loop (COL 6, lines 1-6).

FIG_1



Hence, Bloomfield teaches the specific pump, heat generating fuel cell system, expander, the compressor (the second fuel cell system component) and the condenser satisfying the specific spatial relationship and functional configuration as instantly claimed.

Examiner's note: with respect to the organic liquid, Bloomfield clearly specifies that water recovered from the anode effluent gas streams in the condensers 54 or 80 is combined at mixing point 108 with the cooling fluid of the fuel cell power plant (COL 5, lines 50-62). Bloomfield also teaches that the anode gas stream effluent contains enough unburned gas

(*emphasis added*) such that there is no need for the burner 20 to have a separated fuel supply (COL 4, lines 63-67). It is disclosed that on the anode side, a hydrogen containing liquid fluid such as naphtha is used as the reactant material. In addition, fuels such as methane may be used (COL 4, lines 1-15). *It is noted that naphtha and methane are organic fluids.* It is further disclosed that although the hydrogen containing liquid fuel such as naphtha is processed in the steam reforming reactor 18 (COL 4, lines 1-5), partial processed fuel leaves the reactor 18 (*emphasis added*), entering the shift converter 16 to only reduce the carbon monoxide of the gas stream (COL 4, lines 16-27), from the shift converter 16 the gases pass into the selective oxidizer 14 to even further reduce the carbon monoxide content of gases (COL 4, lines 28-36). Bloomfield also teaches that a shift converter or selective oxidizer is not required (*emphasis added*), wherein the requirement of the fuel conditioning apparatus are dependent in part upon the type of unprocessed fuel being used (*emphasis added*) and upon the particular design of the cells (COL 4, lines 40-50). *Having shown that: a) only partially processed fuel such as naphtha leaves the steam reforming reactor 18; b) no further fuel conditioning such as the shift converter and the selective oxidizer is required; c) unburned gas remains in the anode gas stream effluent, and d) the liquid water or a mixture of liquid water and steam leaving the condenser 102 via a conduit 106 is combined at 108* (*emphasis added*) *with stream recovered from the anode effluent gas streams, it is stated that some of the unprocessed and unburned naphtha reactant being fed into the reforming unit and the fuel cell will remain in the anode effluent gas stream and thus will be mixed at the mixing point 108 with the cooling water recirculating through the fuel cell cooling system. Accordingly, cooling fluid would includes both water and residual organic liquid naphtha as cooling liquid. That is to say, a mixture of cooling water and the unprocessed and*

unburned organic naphtha liquid will be circulating through the thermal exchange circuit of the fuel cell system. Therefore, Bloomfield's teachings envision that a mixture of liquid water and unprocessed-unburned organic liquid naphtha might be used as part of the organic cooling fluid of the fuel cell system.

Regarding claim 17:

Bloomfield discloses the fuel cell stack generally comprises a plurality of fuel cells 24 and a thermal management portion 25 (COL 3, lines 23-27/ COL 5, lines 27-31). *Thus, the heat generating component comprises the fuel cell stack itself.*

With respect to claim 18:

Bloomfield discloses other heat generating components such as the selective oxidizer 14 and the shift converter 16 as well as the heat exchanger 72 (COL 5, lines 28-40). The cooling fluid, for instance, picks up heat from the foregoing heat generating components (COL 5, lines 28-40). *In this case, the selective oxidizer and the shift converter represent catalytic combustors.*

On the matter of claim 19:

It is disclosed that on the anode side, a hydrogen containing liquid fluid such as naphtha is used as the reactant material. In addition, fuels such as methane may be used (COL 4, lines 1-15). *It is noted that naphtha and methane are organic fluids.*

Thus, the claims are anticipated.

Response to Arguments

5. Applicant's arguments, see the amendments filed 11/20/03 and 12/16/03 for specific details, with respect to the rejection(s)of claim(s) 16-20 under the 35 USC 102 statute have been

fully considered and are persuasive. Therefore, the rejection has been overcome. However, upon further consideration, a new ground(s) of rejection is made as seen above. Accordingly, applicant's arguments with respect to claims 16-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone numbers for the

organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro
Examiner
Art Unit 1745